

**A Summary Table of Reabsorption and Secretion Along the Nephron - Anatomy & Physiology**

Substance	Proximal Tubule	Loop of Henle	Distal Tubule and Collecting Duct	Hormonal Influences
<b>Sodium</b>	<ul style="list-style-type: none"> <li>• Passively enters the cell via ion channels or co-transporters in the apical membrane.</li> <li>• Is pumped out of the cell via the sodium/potassium ATPase in the basolateral membrane</li> </ul>	<ul style="list-style-type: none"> <li>• Passively reabsorbed via diffusion from the thin ascending limb</li> <li>• Reabsorbed actively in the thick ascending limb via the Sodium/Potassium/2-Chloride symporter</li> <li>• It is then cleared from the cell via the sodium/potassium ATPase in the basolateral membrane</li> </ul>	<ul style="list-style-type: none"> <li>• The remaining sodium is reabsorbed in the distal tubule via sodium chloride symporters</li> <li>• It is then cleared from the cells via the sodium/potassium ATPase</li> </ul>	<p>The reabsorption of sodium in the distal tubule is under the influence of two hormones:</p> <ul style="list-style-type: none"> <li>• Atrial natriuretic peptide - inhibits sodium reuptake</li> <li>• Aldosterone promotes sodium reuptake</li> </ul>
<b>Potassium</b>	<ul style="list-style-type: none"> <li>• Potassium mainly moves across the membrane via the paracellular route.</li> <li>• It is then pumped into the cell in exchange for sodium via the sodium/potassium ATPase in the basolateral membrane</li> <li>• It then leaves the cell using a symporter with chlorine</li> </ul>	<ul style="list-style-type: none"> <li>• Reabsorbed actively in the thick ascending limb via the Sodium/Potassium/2-Chloride symporter</li> <li>• It also enters the cell via the sodium/potassium ATPase in the basolateral membrane</li> <li>• Potassium from both these sources leaves the cell via a symporter with chlorine</li> </ul>	<ul style="list-style-type: none"> <li>• Potassium is secreted into the lumen by the cells of the <b>distal tubule</b> <ul style="list-style-type: none"> <li>• Potassium enters the cell in exchange for sodium</li> <li>• It is excreted passively through ion channels and using a symporter with chlorine</li> </ul> </li> <li>• Potassium is on the whole excreted from the <b>principal cells of the collecting duct</b> <ul style="list-style-type: none"> <li>• This occurs via the paracellular route and via ion channels</li> <li>• The gradient for the loss via the ion channels is maintained by the sodium/potassium</li> </ul> </li> </ul>	<p>Aldosterone acts on the sodium/potassium ATPase in the principal cells of the collecting duct to increase potassium excretion.</p>

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			ATPase in the basolateral membrane	
			<ul style="list-style-type: none"> <li>The <b>intercalated cells</b> of the collecting duct absorb potassium using a potassium/hydrogen antiporter</li> </ul>	
<b>Urea</b>	Is passively reabsorbed	Passively diffuses into the tubule from the medulla	Freely diffuses from the collecting duct into the medullary interstitium	ADH makes the collecting duct more permeable to Urea
<b>H<sup>+</sup> and HCO<sub>3</sub><sup>-</sup></b>	<ul style="list-style-type: none"> <li>The secretion of H<sup>+</sup> in this section of the nephron is mainly a result of the Na<sup>+</sup>/H<sup>+</sup> antiporter in the apical membrane using secondary active transport.</li> <li>HCO<sub>3</sub><sup>-</sup> is reabsorbed here in a different way to other substances. The presence of hydrogen in the lumen causes some amount of it to dissociate to carbon dioxide and water via the enzyme carbonic anhydrase. These enter the epithelial cells where they are reformed using the same enzyme. The HCO<sub>3</sub><sup>-</sup> then leaves the cell using the basolateral 3HCO<sub>3</sub><sup>-</sup>/Na<sup>+</sup> symporter.</li> </ul>	N/A	<ul style="list-style-type: none"> <li>Hydrogen is excreted in the collecting ducts both in exchange for potassium and on its own using an ATPase.</li> <li>Bicarbonate is reabsorbed.</li> </ul>	N/A
<b>Glucose</b>	It is reabsorbed using a symporter with sodium via secondary active transport	N/A	N/A	N/A
<b>Protein</b>	Is reabsorbed via endocytosis	N/A	N/A	N/A
<b>Calcium</b>	Bulk reabsorption but not regulation of calcium occurs in the proximal tubule	Calcium can passively move paracellularly into the vasa recta	The regulation of how much calcium is reabsorbed occurs in the distal tubule and collecting ducts.	Parathyroid hormone stimulates reabsorption.
<b>Organic Acids and Bases</b>	Secreted here via primary active secretion.	N/A	N/A	N/A